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Because many of the students selected for participation in the University of South Carolina's College of Arts and Science Honors Program failed to attain the minimal grade point level required to remain in the program, the Counseling Bureau undertook an evaluative study to improve selection methods. The project aimed to find answers to 3 questions: "Is it possible to isolate specific cognitive factors which determine academic success? Is it possible to derive a set of regression equations capable of predicting success in the Honors Program by employing scores on the factors isolated? And, how does the efficiency of acturial prediction compare with that of the predictions made by clinically-trained personnel?" The subjects consisted of 182 freshmen entering in Fall 1966--54 Honors Program members and 128 other above-average students. The data analyzed were: high school grades and class standing, Scholastic Aptitude Test scores, American College Test scores, Wechsler Adult Intelligence Scale scores, Minnesota Multiphasic Personality Inventory responses, reference tests for cognitive factors scores, and interview information and behavioral observations. By using a correlational approach and manipulating the variables according to the needs of each specific problem, it was possible to determine the relationships between particular types of behavior and the criterion to be predicted. Findings and recommendations are included. (JS)

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HONORS SELECTION STUDY

1966-67

by

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A PROJECT OF

THE COUNSELING BUREAU

DIVISION OF STUDENT AFFAIRS

UNIVERSITY OF SOUTH CAROLINA

May 1968

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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HONORS SELECTION STUDY 1966-67

INTRODUCTION

The University of South Carolina's College of Arts and Science initiated an Honors Program in the fall of 1965. The primary purpose of this program is to identify, and provide an enriched and stimulating course of study for, academically outstanding entering freshmen. However, it was found that many students selected to participate in the program, who appeared to be well equipped for rigorous academic study, did not attain the minimal grade level required to remain in the Honors Program, a 3.0 (B) Grade-Point Ratio (GPR). Out of the 39 entering freshmen who constituted the first Honors Program class in 1965, 8 or 22% attained below a 3.0 average. Of the 54 who constituted the second freshman Honors group, 44.4% attained less than a 3.0 GPR; in addition, over 11% of these freshmen made less than a 2.0 (C) and one student made less than a 1.0 (D) average. In light of these attrition rates (Grade-Point Ratios below 3.0 GPR), the Counseling Bureau undertook an evaluative study to improve the selection of freshman members of the Honors Program.

A pilot study, performed in the Spring of 1966, indicated that it would be feasible to attempt to define those characteristics which differentiate high-achieving from low-achieving students. The present study was designed to provide a set of regression equations which would permit the prediction of academic achievement for any student in the Honors Program in his first semester at the University. The data used herein were collected during a period of two months, starting about one month before the 1966 school year, and ending approximately one month after the beginning of the first semester. All information was collected by the staff of the Counseling Bureau.

The Population for this study consisted of selected University freshmen entering the College of Arts and Science in the fall of 1966. The total population consisted of two subsamples:

(A) All freshmen members of the Honors Program, selected according to the following criteria (N=54):

    (1) SAT Total score of at least 1200, and

    (2) High School Rank of at least 75th percentile.

(B) And 128 freshmen randomly selected from an available pool of approximately 180 according to the following criteria:

    (1) SAT Total of at least 1000, and

    (2) SAT Verbal score of at least 550.

Because of the small size of the freshman Honors Group, this supplementary population of freshmen with high scholastic aptitude test scores was selected. Inclusion of this group will to some extent broaden the conclusions and results of this study, and also extend the reliability of the findings.

195 subjects originally took part in the study (55 Honors Program Members and 140 other above-average freshmen); however, during the course of the study

thirteen were dropped for various reasons, leaving a total of 182 subjects whose data were used in the various intercorrelations and assessments to be presented.

A list of the data used, including that which was gathered by the Counseling Bureau staff, can be found in Appendix A. The methodology used in this study involved intercorrelation of all available information, elimination of those variables which did not prove to be highly related to the criterion variable (grade-point ratio) and further utilization of those which did. Those variables proving useful were utilized in combination to produce a multiple correlation coefficient which, when adjusted for shrinkage*, provides a tentative answer to the three questions which were the original basis for this study. The three original questions were:

1. Is it possible to isolate specific cognitive factors which determine academic success?
2. Is it possible to derive a set of regression equations capable of predicting success in the Honors Program by employing scores on the factors isolated in answer to Question Number One?
3. How does the efficiency of actuarial prediction compare with that of the predictions made by clinically-trained personnel?

* When attempting to derive rules whereby one event may be predicted from the knowledge of another event, the best method for validation is a replication of the original procedure. However, this is not always possible or feasible. Therefore, a statistical technique has been developed which estimates the reduction in the relationship between the predictors and what they are attempting to predict. This shrinkage formula (described in McNemar, Psychological Statistics, 1962) overestimates the reduction, and thus is generally a more severe test of the original relationship than an actual replication would be.

The results of this study will be reported in three major sections. The first section will be concerned with an answer to Question One and Two (above.) The second section will be concerned with an answer to Question Number Three. A final section will contain the summary and recommendations based on the findings of this study.

RESULTS

Part I: Isolation of Specific Cognitive Factors for Prediction of Academic Success.

Grade-Point Ratio Prediction

The problem of isolating specific factors which are involved in academic success, and deriving from them a set of regression equations capable of predicting success in a high-level academic study program, was approached by a correlational procedure. All available nomothetic data (specified in Appendix) were intercorrelated, through a stepwise regression analysis (Biomedical Computer Program 02R, 1964.) This program computes a sequence of multiple linear regression equations in a stepwise manner. At each step one variable is added to the regression equation. The variable added is the one which makes the greatest reduction in the error sum of squares. Equivalently, it is the variable which has the highest partial correlation with the dependent variable partialed on the variables which have already been added; and equivalently it is the variable which, if it were added, would have the highest predictive value.

From this procedure it was possible to arrive at a correlation between the criterion variable (GPR) and those independent variables which best predicted this criterion. The ideal situation would have been derivation of this correlation coefficient on another population, and application of it to this one. However,

this was not possible within the design of this study, and a correction for shrinkage (McNamar, 1962) was applied, in place of validation of the actuarial prediction equation. Actual validation will be attempted with the data gathered for the 1967-68 Honors Selection Study, and may, at a later date, provide more statistical validation for the results to be presented here.

Of the 42 variables available for each of the 182 subjects, 11 were found to be predictive of the criterion value.**Table 1, below, identifies these variables and their correlation coefficients in comparison with the criterion variable, grade-point ratio.

TABLE I-- Pearson Product Moment Correlations Between Selected Variables and Grade-point Ratio

VARIABLE	LEVEL OF CONFIDENCE	
	5%	1%
SAT-Q		.413
HSR		.507
Cf*	.149	
Ms*	.172	
N*		.308
R*	.152	
V*	.164	

*Cognitive Factors subtests, described in Appendix B

** The five scores of the American College Test (ACT), administered to all entering U.S.C. freshmen in the Fall of 1966, were also included in the data collected for this study. However, as this material was available for only 162 of the 182 subjects, the results of the intercorrelation between the ACT variables and grade-point ratio are included in Appendix C.

Of the 11 variables found useful in predicting GPR, one, High School Rank (HSR), accounted for the most variance. The relationship between college GPR and high school achievement has been identified in so many studies that Educational Testing Service has labeled it as the single most useful predictor of future academic success, with very few qualifications. The useful factor within this "thing" labeled High School Achievement appears to be a "competitiveness factor", which indicates that if a particular student competes successfully with students on one academic level, the probability is great that he will do so on another academic level. Previous research with HSR has generally been done with heterogeneous quality levels at a particular educational level (such as college freshmen, sophomores, etc.); however, it is apparent from our findings that this factor is as meaningful with high academic-ability students as it has been in the past with the full range of academic talent.

The 7 variables listed in Table I were intercorrelated with the criterion variable, resulting in the following multiple correlation coefficient: .581. McNemar's shrinkage formula was applied for 42 variables (the total number in the original correlation matrix from which these variables were derived.) so as to insure that the true multiple would be a maximum value; this should reduce the correlation even more severely than a cross-validation procedure.

Both the original multiple correlation, and the correlations after correction for shrinkage based on two different variable totals, are reported in Table 2. All three correlations reported, even after a somewhat severe reduction in value after shrinkage, are safely beyond the .01 level of confidence. It is likely that if the procedure followed with the 1966-67 Honors Program Freshmen is followed with another group of similarly selected students, a correlation coefficient falling between R_2 and R_3 (as noted in Table 2), will

be obtained.

TABLE 2. Uncorrected and Corrected Multiple Correlations Of The Seven Variables Found Predictive of Grade-Point Ratio

ITEM	CORRELATION
R_1 resulting from the stepwise regression analysis of variables in Table 1 (uncorrected for shrinkage)	.581 *
R_2 resulting from the stepwise regression analysis of variables in Table 1 (corrected for shrinkage on basis of 42 variables -maximum shrinkage)	.381 *
R_3 resulting from the stepwise regression analysis of Variables in Table 1 (corrected for shrinkage on basis of 7 variables- minimum shrinkage)	.563 *

* significant $<$.01 level of confidence

A correlation of the magnitude of R_2 would lead us to believe that we could predict a freshman Honors Program member's first semester GPR correctly 68.5% of the time - One of the magnitude of R_3, 74.9% of the time. Therefore, expecting that in the future our obtained relationship will be between these two values, we can assume that our level of accuracy of GPR prediction, based on the variables and procedure used in this study, will be approximately 72%.

Individual Course Grade Prediction

One of the major difficulties in the prediction of Grade-Point Ratio as such is that it represents a heterogeneous collection of variables. One of the

most difficult to assess of this diverse number of variables is that of actually determining how a grade for a particular student in a particular course is awarded. A great deal of variability is known to exist in grading practices, causing difficulty in predicting the outcome of overall grade-point ratio.

In an attempt to reduce somewhat the diverse number of variables involved in grade prediction, it was planned at the start of this study to attempt the prediction of individual course grades for those courses in which a sufficient number of study-member students enrolled. It is possible that there will be more similarity between grades given for a particular course than has been found in the complex entity "GPR". The results of this analysis are reported here.

The course in which the largest number of subjects enrolled was English 101, composed of non-honors program students. Though not based on an honors level course, the result of this analysis will have relevance for honors program prediction. The course used here was chosen merely because it had the largest number of subjects; for a first attempt at isolation of useful factors for the prediction of individual course grades, having a large number of subjects was more important than the course chosen.

Table 3 reports the variables found to be most highly related to the English 101 grades these subjects received. Whereas in past correlations reported in this paper at least one of the SAT variables and HSR have been found to be the best predictors, with this more specific criterion variable (grade in Freshman English course) other variables appear to be more useful.

TABLE 3-- Variables Significantly Correlated With English 101 NH Grades (N=96)

VARIABLES	LEVEL OF CONFIDENCE	
	5%	1%
HSR		.282
Fi *	.247	
I *	.222	
Mk *		-.357
N *		.270

*Cognitive Factors subtests, described in Appendix B

Variables Fi, I, Mk, and N are cognitive factors subtests. The best single predictor of the English 101 grade criterion is the Mk subtest. This is a Tool (mechanical) Knowledge Test, which requires that the test taker be able to correctly match the picture of an object used in some mechanical operation with another picture of one of 3 tools commonly used with it. The negative correlation between Mk and English 101 grades indicates that the better a student is at this particular test, the lower his grade in English 101 will be, and vice versa. This is an interesting relationship, and has been noted in a subsequent study with a large group of 1967 freshmen in the University's Regional Campus Associate Degree Program, indicating some degree of generalizability to this phenomenon.

The five variables listed in Table 3 were intercorrelated with English 101 grades, resulting in the multiple correlation coefficient (R_4) reported in Table 4. McNemar's shrinkage formula was applied for 42 as well as 5 variables, to provide a possible maximum and minimum value for the multiple correlation

coefficient. The correlations after shrinkage are also reported in Table 4 (R_5 and R_6).

TABLE 4.- Uncorrected and Corrected Multiple Correlations of Variables Found Predictive of English 101 NH Grades.

ITEM	CORRELATION
R_4 resulting from the stepwise regression analysis of variables in Table 4 (uncorrected for shrinkage)	.512 *
R_5 resulting from the stepwise regression analysis of variables in Table 4 (corrected for shrinkage on basis of 42 variables - maximum shrinkage)	.214 *
R_6 resulting from the stepwise regression analysis of variables in Table 4 (corrected for shrinkage on basis of 5 variables - Minimum shrinkage)	.497 *

*significant .01 level of confidence

All three correlations reported in Table 4 are significant beyond the .01 level of confidence. Thus it is likely that if a group of subjects were again similarly selected and subjected to similar treatment (exposure to courses in freshman English), a correlation coefficient falling between R_5 and R_6 would be obtained.

A correlation of the magnitude of R_5 would lead us to believe that we could predict a freshman English student's 1st semester grade correctly 55.8% of the time - One of the magnitude of R_6, 65.2% of the time. Therefore, expecting that in the future our obtained relationship will be between these two values, we can assume that our level of accuracy of freshmen English grade

prediction, based on the variables and procedure described above, will be approximately 61% .

PART II: Subjective Versus Actuarial Prediction of Academic Success

A comparison of the efficiency of actuarial (statistical) prediction with that of the predictions made by clinically-trained graduate students (subjective prediction) has theoretical as well as practical significance. In the realm of practicality, a comparison of this sort should indicate whether it is better to admit freshmen to the Honors Program on the basis of numerical facts known about them (i.e., age, sex, high school rank, Scholastic Aptitude Test scores, and other data of this type), or on the basis of more variable, less accurately formulated, human judgments.

In order to compare these two different approaches to prediction, two determinations of academic success were made for each subject. One of these was a "clinical prediction", the other an "actuarial" prediction. The clinical decision of academic success was made by nine graduate students in clinical psychology who acted as psychometrists in administering the WAIS. An attempt was made to include among these students a wide range of graduate and practical experience. Each psychometrist was asked to evaluate the information made available for each student he tested and interviewed. This included the information in Items 1(a), 2, 4, and 5 (a),(listed in Appendix A), as well as the non-quantifiable information obtained from the Interview (Item #7) and behavioral observations from the WAIS (Item #) test session. The psychometrist was then asked to indicate, on a unidimensional scale ranging from 1 to 6, what he decided the subject's likelihood was of attaining a 3.00 or better average his first semester. A mark of 6 on this scale indicated an excellent likelihood, while a

mark of 1 indicated very little likelihood. A copy of the rating sheet can be found in Appendix D.

The actuarial decision was made by computer manipulation of all available quantifiable information. The data in Items 1-6 (in Appendix A), minus high school grades in Item #1) were programmed for computer manipulation. The criterion variable which allowed the machine to weigh the test information it used was the obtained first semester GPR (by a BMD-o2R procedure similar to that described previously, in Part I of Results Section.)

The clinical predictions and obtained grade-point ratios for all subjects (N=182) were correlated; the resulting correlation coefficient is included in Table 5. The stepwise regression analysis (which comprised the actuarial prediction procedure) resulted in a multiple correlation, also included in Table 5.

TABLE 5. Clinical and Actuarial Multiple Correlation Coefficients

	ITEM	CORRELATION
R_1	between Clinical Prediction & Obtained GPR	0.392*
R_2	resulting from the stepwise regression analysis (uncorrected for shrinkage)	0.592*

*significant $<.01$ level of confidence.

In order to correct for the fact that the actuarial multiple correlation was derived on and applied to the same sample, a correction for shrinkage (McNemar,1962)

was applied. The multiple actuarial correlation, corrected for shrinkage, is reported in Table 6. In addition, the multiple actuarial correlation using only the three variables found to be most highly correlated with the criterion variable, and its corrected (attenuated) value, are included in Table 6.

TABLE 6. Uncorrected and Corrected Actuarial Correlation Coefficients

ITEM	CORRELATION
R_3 resulting from the stepwise regression analysis (corrected for shrinkage)	0.528*
R_4 resulting from the first 3 steps in the stepwise regression procedure (uncorrected for shrinkage) [1]	0.562*
R_5 resulting from the first 3 steps in the stepwise regression procedure (corrected for shrinkage)	0.556*

*significant $<$.01 level of confidence

[1] included High School Rank, SAT Q, and WAIS A

The correlations resulting from the clinical (R_1) and actuarial (R_5) procedures were statistically compared. The difference found between these two correlations, and hence between the two procedures they represent, was significant at the .04 level of confidence.

Confidence limits, which indicate the variability which could be expected in correlations resulting if these procedures were replicated, are shown in Table 7.

TABLE 7. Confidence Limits For The Clinical and Corrected Actuarial Correlation Coefficients

ITEM	CORRELATION	CONFIDENCE LIMITS*
R_1	0.392	0.260 - 0.505
R_3	0.528	0.415 - 0.625
R_5	0.556	0.445 - 0.650

* 5% level

The actuarial procedure for determination of grade-point ratio is superior (statistically) to the clinical procedure. In addition to the significant difference found between the multiple correlation based on the 3 most predictive variables (actuarially manipulated) and the clinical prediction correlation, the actuarial correlation accounts for fully 50% more error reduction of variance than the clinical prediction correlation coefficient.

SUMMARY AND RECOMMENDATIONS

SUMMARY

Students selected for participation in the University of South Carolina's College of Arts and Science Honors Program have been found to not perform academically as well as was expected. Because attrition rates in this program (GPRs below the 3.0 minimum) were felt to be excessive, the Counseling Bureau made an evaluative study to improve the selection of freshman members of the Honors Program.

Subjects for this study consisted of selected USC freshmen entering the College of Arts and Science in the Fall of 1966. The total study population was composed of two subsamples: the fifty-four freshman members of the Honors Program, and a supplementary group of 128 subjects added in order to increase the size of the study population (Total N=182). All subjects had an SAT total of at least 1000, and an SAT Verbal score of at least 550.

A number of psychological tests were given these subjects, and other data pertinent to the study was collected. A list of the standardized tests given, and other data collected for each subject, are listed in Appendix A.

The methodology of the study was primarily correlational, and the variables used in each major manipulation varied according to the needs of each specific problem. The purpose of using this approach was to ascertain the relationships existing between particular types of human behavioral information and the criterion to be predicted. Once a substantial relationship is found, the relevant information can be used in the future to predict behavior.

The findings of this study will be briefly summarized as follows:

PART 1. Isolation of Specific Cognitive Factors for Prediction of Academic Success

Grade-Point Ratio Prediction

The general intercorrelation procedure reduced the initially large number of original variables (47) to a much smaller number of useful ones. Eleven variables were found to be substantially predictive of the criterion variable (GPR). Of these eleven useful variables, High School Rank appears to be the most utilitarian. This finding is consistent with most of the research in the prediction of college GPR.

Previous research with HSR has generally been done with students representing a crossection of scholastic aptitude; however, it is apparent from these findings that this factor is as meaningful with high academic-ability students as it has been in the past with the full range of academic talent. The present findings indicate that more emphasis might be placed on HSR with entering freshmen applying for an enriched curriculum than has been to date.

In addition to HSR, other predictive variables were isolated. These were the Quantitative score from the SAT (CEEB), and five subtests from the Cognitive Factors battery. The SAT Q score, when used in a step-wise regression procedure with HSR, significantly reduces the variable error involved in predicting the criterion variable (GPR). Sat Q, HSR, and the five Cognitive Factors subtests, when used in multiple inter-combination, result in a correlation which accounts for approximately 35% of the variable error involved in the prediction of first semester freshman GPRs. This is more error reduction than is generally found in studies of this nature.

Based on the findings of this phase of the HSS, it is possible to conclude that in the future the level of accuracy of overall first semester GPR prediction, based on the variables and subjects used in this study, will be approximately 72%.

In order to reduce the diverse collection of variables generally involved in the prediction of overall grade-point ratio, one aspect of this study involved the prediction of individual course grades.

The course in which the largest number of subjects enrolled was English 101; thus it was selected for the individual course grade prediction attempt.

Different variables were found to be predictively useful with this individual course grade criterion than had been found useful with the overall GPR intercorrelation reported previously. However, two of the five variables found useful here were also isolated previously. These are HSR and one of the Cognitive Factors subtests (N); the other three variables found to be significantly related to the individual grade criterion were also Cognitive Factors subtest scores. The best single predictor of the criterion was found to be one of the Cognitive Factors variables (Mk).

The five variables found significantly useful here were intercorrelated with English 101 grades; the resulting correlation accounted for approximately 26% of the variable error involved in the prediction of this first-semester grade. After correction for attenuation, this variance reduction figure varied between 5 and 25%.

Based on the findings of this phase of the HSS, it is possible to conclude that in the future our level of accuracy of prediction of English 101 grades, based on the methods and type of subject used in this study, will be approximately 61%.

Other individual course grades of subjects in this study have been analyzed; however, they were based on much smaller numbers of subjects than was the English 101 NH analysis, and hence are more subject to uncontrollable or unassessable error than was the English course grade.

From an analysis of the data presented in this section, it is possible to conclude that it is not only feasible to attempt to predict a freshman Honors Program student's academic performance from an individual grade approach, but that

this may eventually become the preferred way of doing so. If sufficient subjects can be found in the courses which these students will take, and analyses similar to the ones described herein are performed, individual criteria for success in individual courses can be developed. These individual criteria might provide, when taken as a whole, a better predictive estimate of a prospective Honors Student's academic performance than the overall GPR prediction attempt does at present.

PART II: Comparison of Actuarial and Clinical Prediction of Honors Program Freshman Academic Performance

A comparison of the efficiency of two different methods of academic performance prediction was undertaken in an attempt to discern which of the two methods would be the most economical and efficient to use in future Honors Program freshman selection.

The method followed for a comparative analysis of the predictiveness of both methods was described. It was found that the actuarial procedure for determining which student would meet the criteria (3.0 GPR) was significantly more predictive than was the more subjective, idiographic, clinical procedure for doing so. These findings indicate that it would be more efficient to select students for inclusion in the freshman Honors Program class by a set list of criteria.

RECOMMENDATIONS

I. The Counseling Bureau research staff reported to the Director of the Honors Program and the Honors Council in the Spring of 1967 that the original requirements for freshman admission to the Honors Program could be lowered without ill result. At that time we recommended an SAT Total of at least 1100, with an SAT Verbal score minimum of 450-500, and a HSR of at least 75%.

On the basis of this study, a modification in the above criteria is recommended. This adjustment is provided by an equation for the prediction of GPR and the Probability Table which accompanies it.

Before the equation and table are presented, some information about its applicability should be provided. One must be cautious about generalizing the results of statistical analyses derived from one population to a different group of subjects. Therefore, it is difficult to say what the result will be if a predicted GPR is computed for students whose SAT and HSR scores vary greatly from those of the participants in this study. The minimum requirements for admission to the study were SAT Total of 1000, and an SAT-V score minimum of 550. It is possible that the equation will predict well for below-criteria subjects; however, with presently available data it is impossible to say.

To compute the predictive equation for all entering USC freshmen in order to choose prospective Honors Program members would be impractical. Thus a rule of thumb is provided. From further calculations with the predictive equation and the probability table, it was possible to ascertain that it would be impractical to even compute the predicted GPR for prospective freshmen with an SAT-Q score below 500. Application of the equation to students with

this minimum score should provide an adequate sample from which to select freshman members of the Honors Program. In addition to starting selection procedures with students with a minimum of 500 SAT-Q, it would be most advisable to begin with students with the highest available HSRs, and as necessary descend to those with lower HSRs.

Procedure for use of Predicted GPR Equation and Probability Table

The Predicted GPR Equation is as follows:

$$\text{Pred GPR} = 0.39544 + 0.00297\ (\text{SAT -Q}) + 0.43366\ (Z_{HSR})\ *$$

Calculation of the predicted GPR, by inserting the student's SAT-Q score and HSR in the proper places, requires a simple statistical manipulation. HSR in this equation is in the form of a Z-score, transformed from a percentile indicating Rank in graduating high school class. A description of procedure for transformation of percentiles into Z-scores is presented in Underwood (1954,pp.78-82). A table which simplifies this transformation can be found in Edwards (1964,Table III, pp. 490-499).

* Equation was produced from stepwise multiple regression analysis (BMD-02R) of the data collected for the 1966-67 HSS. Note that the above equation is based on only two variables, whereas Table 1 presented seven variables found to be significantly predictive. The five variables found to be useful in GPR prediction, but not included in the equation presented here, were left out because their added increment of prediction was not sufficient to warrant their use at this time. Present results indicate that these additional variables are potentially useful for prediction of academic success in an enriched academic program. Consideration might be given to developing a test instrument composed of these Cognitive Factor variables which, when administered to Honors Candidates, will enable finer selection.

TABLE 9-- Predicted GPR Probability Estimates

Predicted GPR [1]	Z	Probability
4.112	+0.842	.80
3.891	+0.674	.75
3.693	+0.524	.70
3.520	+0.386	.65
3.331	+0.250	.60
3.165	+0.125	.55
3.000	0.000	.50
2.835	-0.125	.45
2.669	-0.250	.40
2.480	-0.386	.35
2.308	-0.524	.30
2.109	-0.674	.25
1.888	-0.842	.20

[1] Derived through use of prediction equation

This table is useful for determining the chances a student with a particular predicted GPR has of attaining a 3.0 GPR his first semester at USC.

The first column of the table is composed of predicted GPRs, ranging from 4.112 - 1.888. The second column is useful only if interpolation between scores present in the table becomes necessary, and should be of no concern now. The third column contains probability estimates.

The table can be used as follows: first, a predicted GPR for a particular student is calculated (through use of the equation presented above); the predicted GPR in the first column of the table, which is closest to the predicted

GPR derived from calculation of the particular student's scores is found. The probability estimate which corresponds to this predicted GPR score in the table is the probability that this particular student will make a 3.00 GPR his first semester at USC.

For example, if John Doe (fictitious student), has an SAT-Q score and a HSR such that his predicted GPR (through use of the equation presented above) turns out to be 3.00, we can determine that his chances of actually attaining a 3.00 GPR his first semester at USC is 50:50, or on a chance level. However, if his predicted GPR turns out to be 3.5, the probability is 65:35 that he will be able to attain a 3.00 GPR.

It should be understood that these figures are based on the statistical laws of occurrence, within the limits provided by the data of this study. They should be used and interpreted in light of the rules of probability.

II. Supplementary Recommendations

The following Recommendations are based on a less statistical, quantitative basis than the previous one. However, it was felt that information based on the informal observation of the Honors Program and its student members (over a period of 2 1/2 years and through two studies of the Program), could be potentially useful to those who must decide the future direction and policies of this program.

Therefore, the following four recommendations are added as supplements to the first recommendation, and should not be construed to be based on presently quantified information. In addition, it should be noted that due to lack of space and time, the problems dealt with in this supplement were not elaborated upon in the body of this report.

The views expressed in this final section are those of the principal investigator of this study, and are not necessarily those of the Counseling Bureau or the Division of Student Affairs.

RECOMMENDATIONS:

A. Standardization of curriculum of freshman Honors Program members.

Some members of the 1967-68 freshman group took one honors-level course; others took as mamy as 4. At this point it is difficult to assess the effect different course loads such as these have on the GPRs of these students. However, these large differences ir honors -level hours carried make assessment of these students difficult, and results of such assessments less comparable and meaningful than if there were more similarity between freshman course loads.

To facilitate future assessment, the recommendation is made that there

be required for the 1968-69 freshman Honors Group, a "core" curriculum consisting of a minimum of 2 and a maximum of 4 honors-level courses for at least the first semester.

B. Level of performance expected of Honors Program freshmen.

Different professors require different performances for the same letter grade. With little or no agreement in this area, the only clearcut, practically universally accepted criterion variable for college success (the grade-point ratio) is not stable enough to enable completely reliable prediction. A certain amount of difference in grade assignment is inevitable; however, once it passes some point, prediction becomes a tenuous exercise in probabilities.

Thus, it is recommended that there be some agreement among the professors teaching freshman honors program students as to:

(a) the grading system to be used-- whether there shall be a "normal" distribution of A's to F's, or whether all grades for these students will be As and Bs.

(b) the quantity and quality (roughly) of work expected of these students in each course area.

In addition, the recommendation is made that there be prepared a written description of each freshman honors-level course, including what material students are responsible for, etc. (this has been specifically mentioned by students in the 1966 and 1967 programs on several occasions, and thus mentioned here.)

C. Personal Adjustment of Honors Program freshman students.

Honors Program students appear to have problems with adjustment to college life, home and family, academic work, and peers much as do other

university students. However, for some unknown reason, they do not seem to seek assistance with these difficulties.

Thus we recommend an assistant for the Director of the Honors Program, whose primary concern would be academic and non-academic adjustmental problems of Honors Program students. This person could refer students in need of intensive emotional aid to one of the existing USC agencies as necessary, and maintain group socio-emotional seminars for interested Honors Program students.

D. Future suggested areas of investigation with Honors Program members

1. Remedial
   a. Reading and Study Skills
   b. Socio-emotional (group and individual counseling sessions)
2. Academic and Occupational Interests
   a. relationships between stated interests (SVIB,etc.) and chosen majors- long-term followup of these may indicate insightful relationships useful to incoming honors freshmen
   b. clearness and definiteness of academic and occupational goals- (ie. it has been found that the student with set goals generally is more academically successful in college.)
3. Cognitive Factors and related Processes
   a. research over past 2 years has indicated that it is feasible to delineate those cognitive factors which best relate to known academic areas. Only over time can consistent, reliable relationships be definitively established. What has thus far been accomplished is merely a working base, on which can be built a predictive structure of some dimensions, however, in order to eventually achieve this, the present work should be continued as diligently as possible.

Suggested Research Areas

4. Academic Backgrounds of Prospective HP Freshmen

More needs to be known about the academic backgrounds these students bring to USC, thus we should look into the effects on college academic progress the following have on freshman honors program students:

a. size of high school attended

b. number of HS credits completed

c. what these credits consisted of (it is often more important to know that a student took more than the required number of math, science, language, and English credits than that he finished in the top quarter of his class, even though there is often a relationship between these two factors - however, at present we know virtually nothing about the relationship between courses taken and their applicability to college academic work.

d. It should be added here that an analysis of the high school credits of subjects in this study was made. It was found that at present, the predicted GPR equation presented previously is more useful for selection than use of high school credit information. However, this tentative analysis indicated that further analysis of this information is unwarranted.

e. Differences between males and females on the variables used in this study - due to lack of time and space. There differences were not reported in the body of this report, but will be provided at a later date in a separate paper.

f. Assessment of the differences between students selected for inclusion into the Honors Program, and those who volunteer for this program.

APPENDIX

A. Data Available for this Study

1. High School Grades and Class Standing
   a. high school grades used for clinical prediction purposes
   b. high school class standing (rank in graduating class) used in actuarial manipulations (as a percentile, converted to Z-score)
2. Scholastic Aptitude Test (SAT) scores
   a. Verbal
   b. Quantitative
3. American College Test (ACT) scores- all 5 subtests used, in standard score form
4. Wechsler Adult Intelligence Scale (WAIS) scores
   a. Verbal
   b. Performance
5. Minnesota Multiphasic Personality Inventory (MMPI) responses
   a. MMPI profile used by psychometrists for the clinical prediction
   b. MMPI individual item responses were programmed for computer manipulation in the form of 4 response set scales [1]
6. Reference Tests for Cognitive Factors [2] scores - all 24 subtest scores were used, in raw data form
7. Interview Information - Behavioral Observations

[1] Dahlstrom and Welsh (1962, pp.430-433)
[2] Kit of Reference Tests for Cognitive Factors. French, et.al., Educational Testing Service, Princeton, N.J., June 1963.

B. Description of Cognitive Factors Subtests Identified As Useful In Various Intercorrelations Reported in This Study.

1. Flexibility of Closure (Cf-1)- Factor Description: the ability to keep one or more definite configurations in mind so as to make identification in spite of perceptual distractions. Believed to be related to Field-Independence (as described by Witkin). Test: an adaptation of the Gottschaldt Figures Test popularized by Thurstone; task is to decide which of 5 geometrical figures is embedded in a complex pattern. Difficulty level high.
2. Ideational Fluency (Fi-2)- Factor Description: the facility to call up ideas wherein quantity and not quality of ideas is emphasized. Test: a theme test, the task being to write as much as possible about a given topic. Adapted from Taylor's version of a test by Cattell.
3. Induction (I-2) - Factor Description: associated abilities involved in the finding of general concepts that will fit sets of data, the forming and trying out of hypotheses, etc. Test: task is to discover the rule involved. Adapted from Thurstone.
4. Tool Knowledge Test (Mk-1) - Factor Description: knowledge of mechanical principles, devices, and tools, acquired through experience and training. Test: task is to select the one of 3 pictured tools which is commonly used with a first pictured object.
5. Memory Span (Ms-1)- Factor Description: the ability to recall perfectly for immediate reproduction a series of items after only 1 presentation of the series. Test: an auditory number span test, with digits in series of varying lengths being read at a speed of 1 second per digit.

6. Number Facility (N-2)- Factor Description: the ability to manipulate numbers in arithmetical operations, rapidly. Test: a speed test, involving dividing 2- or 3- digit numbers by single-digit numbers.
7. General Reasoning (R-4) - Factor Description: Assessment of the ability to solve a broad range of reasoning problems including those of a mathematical nature. Test: task is to determine what numerical operations are required to solve arithmetic problems without actually having to carry out the computations. Adapted from Guilford.
8. Verbal Comprehension (V-5) - Factor Description: assessment of the ability to use the English language. Test: A 4-choice synonym test consisting mainly of difficult items. Adapted from a test by J. B. Carroll.

C. TABLE 8 -- Correlations Between American College Test Scores And Grade-Point Ratio

VARIABLE	LEVEL OF SIGNIFICANCE	
	5%	1%
Eng		.248
Math		.347
Soc S	.170	
N. Sci		.233
Comp	NS*	

*Not significant

D. Sample Copy of Rating Sheet Used By Psychometrists in Making The Clinical Judgment.

RATING SHEET

Subject's Name_____ Date_____

Counselor's Name_____

Counselor's Subject Number_____

I feel this person will make a 3.0 or higher GPR first semester USC: YES NO

I feel this person will make a 3.0 or higher GPR first semester USC:

1 2 3 4 5 6

You have made your prediction-- state below on what basis you did so.

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